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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/693,564	10/27/2003	Hiromi Katoh	4539-0110P	3603
2292	7590	01/13/2006	EXAMINER	
BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747			VU, PHU	
			ART UNIT	PAPER NUMBER
			2871	

DATE MAILED: 01/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/693,564

**Applicant(s)**

KATOH ET AL.

**Examiner**

Phu Vu

**Art Unit**

2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☐ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) 15-23 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 3,7 and 24 is/are allowed.
- 6) ☒ Claim(s) 1,2,4-6,8-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____.  |

## **DETAILED ACTION**

### ***Response to Arguments***

Applicant's arguments filed regarding claims 1-2, 4-6, and 8 - 15 have been fully considered but they are not persuasive. Applicant's specific shift ratio dictated by the thickness of the birefringent element is not explicitly taught by the prior art however the Okumura teaches that the thickness regulates this ratio and that it can be optimized. The MPEP section 2144.05 states "Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum workable ranges by routine experimentation." Furthermore at least in claim 4, applicant discloses that the shift ratio can be 1 to 2 or 2 to 1. Applicant also discloses another embodiment (claim 3) wherein the shift ratio is 1 to 1. Therefore the shift ratios are considered minor optimizations since the shift ratio is not limited to 2 to 1 in every case.

Applicant's arguments with respect to claims 3, and 7 have been fully considered and are persuasive. The rejection of claims 3 and 7 has been withdrawn.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1 –2, 4-6 and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okamura et al. US Patent No. 6061103.**

**Regarding claims 1 and 4,** Okamura teaches an optical shifter comprising a first optical shifting section and a second optical shifting section, each of which is able to transmit an incoming light ray after having shifted the optical axis thereof, the first and second optical shifting sections being arranged such that a light ray that has been transmitted through the first optical shifting section enters the second optical shifting section, wherein each of the first and second optical shifting section includes: a liquid crystal element including a liquid crystal cell (fig. 30 element 73 and 75), the liquid crystal cell selectively changing the polarization direction of the incoming light ray in response to a voltage applied to thereto; and a birefringent element (fig. 30 elements 74 and 76) which, receives the light ray that has been transmitted through the liquid crystal element and which exhibits one of the multiple different refractive indices according to the polarization direction of the incoming light ray. Okamura does not explicitly teach the magnitude of the shift caused by the first optical shifting section between the optical axes of the incoming and outgoing light rays thereof is substantially twice greater than of shift caused by the second optical shifting section between the optical axes of the incoming and outgoing light rays thereof. However, applicant admits that the magnitude of the shift is proportional to the thickness  $t$  (see applicant specification US 2004/0085486 [0111]), and element 10'a is twice as thick as the second optical shifting section 10'b (see [0122]) applicant only uses the thickness to determine the relative amount of shifting between the two sections. However, the reference also teaches that the amount of thickness determines the shift amount (see column 6 lines 27-31). Therefore applicant's modification of having the magnitude of the first shift twice the magnitude of the second shift is considered obvious

over Okumura's teaching of the magnitude of the shift being modified by a variation in the width since applicant uses a variation in width to vary the shift amounts as well. Therefore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to use modify the width to achieve any ratio between the shifts.

**Regarding claim 2**, the reference teaches the optical axis of the birefringent element included in the second optical shifting section (see fig. 30 elements 74 and 76).

**Regarding claim 5**, the limitation of the magnitude of the shift caused by the first optical shifting section between the optical axes of the incoming and outgoing light rays thereof is substantially twice greater than the shift caused by the second optical shifting section between the optical section is obvious over Okumura's teaching of the magnitude of the shift being modified by a variation in the width since applicant uses a variation in width to vary the shift amounts as well.

**Regarding claims 6, 8-10**, the limitation "wherein the optical axis of the outgoing light ray of the second optical shifting is defined by one of first, second, and third positions according to a combination of voltages applied to the liquid crystal elements of the first and second optical shifting sections, the first aligned with the optical axis the second been shifted by  $d$  and the third been shifted by  $2*d$  is met by an optical shifter having two sections with the magnitude of shift caused by the first optical shifting section twice greater than that of shift caused by the second optical shifting section and a liquid crystal cell selectively changing the polarization direction of the incoming light ray in response to a voltage applied thereto. Consider an optical shifter as in fig. 30 with element 74 having a shift amount twice that of element 76. Turning element 73 on while leaving element 75 off

would result in the output shifted by  $2 * d$  and turning element 75 off while leaving element 74 off would result in a shift of  $d$  and both polarization elements off would result in a the output aligned with the optical axis of the incoming light ray. The limitation of a fourth position with  $3*d$  shift would require both polarization elements to be on.

**Claims 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okamura in view of Fergason et al. US Patent No. 5715029 and further in view of Tarumi et al. US Publication No. 2002/0047105.**

**Regarding claims 11 and 12,** Okamura discloses all the limitations of claims 11 and 12 except the liquid crystal cell is a TN mode and the liquid crystal cell exhibiting positive dielectric anisotropy. The limitation of the quartz plate being a made of uniaxial crystals is met because the plate exhibits one axis (see fig. 30 elements 74 and 76). However, Fergason teaches an optical shifter that uses a conventional twisted nematic LCD with a quartz crystal. Tarumi teaches that most display quality twisted nematic liquid crystal panels use positive dielectric liquid crystal therefore use of positive dielectric anisotropic liquid crystal also is considered conventional. Conventionality has associated benefits such as lower production costs, maturely developed or perfected implementations, and ready availability. Therefore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to use a twisted nematic liquid crystal with positive dielectric anisotropy to gain benefits of conventionality such as lower production costs, maturely developed implementations and ready availability.

**Regarding claims 13-15,** Okamura discloses the quartz plate being a made of uniaxial crystals is met because the plate exhibits one axis (see fig. 30 elements 74 and

76) and the limitation of the of the directors cross each other at right angles on a pair of planes of the first and second liquid crystal cells is also met by the primary reference because Okamura discloses the liquid crystal rotates incident light by 90 degrees in the off state therefore the liquid crystals are considered to have directors that make a 90 degree angle when crossed. Okamura fails to disclose a TN mode and the liquid crystal cell exhibiting positive dielectric anisotropy and having opposite optical. However, Fergason teaches an optical shifter that uses a conventional twisted nematic LCD with a quartz crystal. Tarumi teaches that most display quality twisted nematic liquid crystal panels use positive dielectric liquid crystal therefore use of positive dielectric anisotropic liquid crystal also is considered conventional. Conventionality has associated benefits such as lower production costs, maturely developed or perfected implementations, and ready availability. Therefore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to use a twisted nematic liquid crystal with positive dielectric anisotropy to gain benefits of conventionality such as lower production costs, maturely developed implementations and ready availability.

***Allowable Subject Matter***

**Claims 3, 7 and 24 are allowed.**

**Regarding claim 3, 7 and 24,** there is no prior art of record that teaches an optical shifter comprising first and second optical shifting sections, each of the first and second sections comprising a first and second liquid crystal cell that selectively changes the polarization direction of the incoming light ray in response to the voltage applied thereto; and a birefringent element, which receives the light ray that has been transmitted through

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the liquid crystal element and which exhibits one of multiple different refractive indices according to the polarization direction of the light ray. Claims 7 and 24 depend from claim 3.

Okamura as cited above teaches an optical shifting with only a single liquid crystal cell that changes the polarization state of the incoming light ray in response to a voltage and birefringent element. The second liquid crystal panel in each shifting section prevents a transitional state from occurring when two liquid crystal panels are switched at the same time thereby diminishing display quality due to a difference in switching speeds between the panels.

The prior art has taught multiple liquid crystal cells to improve color balance, provide additional compensation, and provide shuttering effects however neither of these teaches apply to liquid crystal panels when used as only polarization switch and if applied would be applied to the image producing LCD in the device not the LCD's found in the optical shifter.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action.



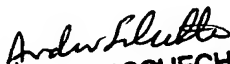
In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phu Vu whose telephone number is (571)-272-1562. The examiner can normally be reached on 8AM-5PM M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (571)-272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Phu Vu  
Examiner  
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ANDREW SCHECHTER  
PRIMARY EXAMINER